Technical Appendix 7.5

Clune Wind Farm

Outline Habitat Management and Biodiversity Enhancement Plan

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Document Prepared For

Euan Hogg
Development Project Manager
RES Group
Beaufort Court
Egg Farm Lane
Kings Langley
Hertfordshire
WD4 8LR

Document Prepared By

Adam Rochester
Senior Ecologist
adam.rochester@atmosconsulting.com

Emilie Michael
Principal Ecologist
emilie.michael@atmosconsulting.com

Document Approved By

Dr Mikael Forup
Technical Director (Biodiversity & BNG)
mikael.forup@atmosconsulting.com

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1 Introduction

1.1 Terms of Reference

This Outline Habitat Management and Biodiversity Enhancement Plan (OHMBEP) is provided in support of Clune Wind Farm, a proposed 26 turbine development located approximately 3km south of Tomatin, Highland (the "Proposed Development"). It was informed by the results of baseline ecology, ornithology and peat studies, and by the Environmental Impact Assessment (EIA) undertaken.

This OHMBEP will be finalised following the completion of the planning process in collaboration with The Highland Council (THC) and at this stage should be regarded as a first iteration.

A full description of the Proposed Development is available in Chapter 3: Proposed Project Description of the EIA Report.

1.2 Site Location and Description

The Site (Figure 7.5.1, Appendix A refers) is located approximately 27km south-east of Inverness, and approximately 5.5km south of the village of Tomatin. The Site is predominately managed upland grouse moorland with agricultural fields and mixed woodland in lower altitude areas. Clune Burn and Allt Lathach traverse the Site along with other smaller tributaries running into the River Findhorn that lies to the north-west, out with the Site boundary.

The Site inclines generally in a north-east to south-west direction, reaching the highest point of the Site, 750m, at Carn Dubh'Ic an Deoir. The northern edge is bounded by the River Findhorn and the eastern boundary by the A9. The Site can be approximately divided by four main watercourses that flow north into the River Findhorn: Allt Phris, Clune Burn, Allt Lathach, and Wester Strathnoon Burn.

The Site is mainly used as a grouse moor, managed by grazing livestock such as sheep, and regular burning of mature heather to provide new growth. The Site also consists of small patches of grassland along the northern boundary used by grazing livestock, a block of conifer plantation in the north-east, and an area of ancient deciduous woodland on the banks of the Allt Phris. There is some evidence of grazing pressure from deer. The survey area contains a variety of plant communities including blanket bog, wet heath, acid grassland, scrub and deciduous woodland.

The proposed access track will be situated on the north-eastern boundary of the Site, connecting to the A9 just north of Slochd summit, using an existing minor junction. The plant communities within the access track boundary are a mix of heath, blanket bog, scrub, and birch *Betula* sp. woodland.

1.3 Aims and Objectives

The main objective of the OHMBEP is to reverse biodiversity loss and deliver positive effects to habitats on the Proposed Development Site for described ecological receptors, particularly blanket bog habitats and natural regeneration of Caledonian forest. This will be achieved through a programme of habitat management and enhancement with the aim of improving semi-natural habitats on the Proposed

Development. The OHMBEP will contribute to both national and regional priority conservation action plans including Scotland Government's 2022 Biodiversity Strategy (native woodland establishment), and NatureScot's Peatland ACTION targets and species action plans, notably the Capercaillie Emergency Plan.

1.4 Scope of the Outline Habitat Management and Biodiversity Enhancement Plan

The Outline Habitat Management and Biodiversity Enhancement Plan is required to satisfy the Highland Council planning requirements. The proposed enhancements within this Technical Appendix correspond to the proposals to maximise Biodiversity Net Gain as set out in Technical Appendix 7.6.

The OHMBEP is an iterative document which will be revised, updated and re-issued throughout the construction and operational phases of the Proposed Development. In this way, the OHMBEP, through an agreed monitoring programme, will take account of the successes and failures of the proposed management measures and modifications to the management regime can then be proposed as necessary. The OHMBEP will be reported and updated in consultation with a Habitat Management Group (HMG).

The OHMBEP considers the specific features of the Proposed Development, the local area, existing and future land use, and the Proposed Development Site in making recommendations based on best information currently available. If aspects relating to the Proposed Development are altered, or new ecological information emerges, then the OHMBEP will be required to be adapted accordingly.

The OHMBEP considers the management of the habitats and species to enhance biodiversity over the expected 40-year lifespan of the Proposed Development. The geographical scope of the OHMBEP is represented in Figure 7.5.4.

The reader should note that the management and monitoring of any ecological impacts identified associated with the construction of the Proposed Development, and any immediate re-instatement of habitats post-construction, will be outlined within the Construction Environmental Management Plan (CEMP).

2 Designated Sites and Position in the Landscape

There are nine sites designated for ecological (non-avian) interest in the vicinity (<10km) of the Site (see Technical Appendix 7.1 Extended Phase 1 Habitat and NVC Surveys 1 and NVC Figure 7.1.2). Kinveachy Forest SSSI and SAC designations are in close proximity to the Site together with Slochd SAC. See Figure 7.1.2 showing the position of the SSSI in relation to the Site.

Table 1: Designated Sites

Designated Site	Designated Feature	Distance from Site Boundary
SACs		
Slochd (SNH, 2005a)	European dry heaths	0.17km to the north-east (at its closest point)
Kinveachy Forest (SNH, 2005b)	Bog woodland Caledonian forest	0.65km to the south-east (at its closest point)
River Spey SAC (SNH, 2005c)	Otter *Lutra lutra* Freshwater pearl mussel *Margaritifera margaritifera* Sea lamprey *Petromyzon marinus* Atlantic salmon *Salmo salar*	1.66km to the south-east (at its closest point)
Carn nan Tri-tighearnan (SNH, 2005d)	Blanket bog	7.15km to the north (at its closest point)
SSSIs		
Kinveachy Forest (SNH, 2010)	Native pinewood assemblage including: • Scots pine *Pinus sylvestris* • Birch *Betula* sp. • Alder *Alnus glutinosa* Breeding bird assemblage including: • Capercaillie *Tetrao urogallus* • Scottish crossbill *Loxia scotica* • Crested tit *Lophophanes cristatus*	Partial overlap of the south-eastern edge of the Site boundary with no oversail by any proposed turbine
Carn nan Tri-tighearnan SSSI (SNH, 2009b)	Blanket bog Subalpine dry heath	7.15km to the north (at its closest point)
Loch Vaa (SNH, 2009c)	Goldeneye *Bucephala clangula* Slavonian grebe *Podiceps auritus* Aquatic beetles including nationally scarce and notable species such as: • *Berosus luridus* • *Hydrochus brevis* • *Cyphon punctipennis* • *Agabus labiatus*	
Craigellachie SSSI (SNH, 2009a)	Upland birch woodland: • Silver birch *Betula pendula* • Aspen *Populus tremula* • Hazel *Corylus avellana* • Sessile oak *Quercus petraea* • Wych elm *Ulmus glabra*	8.93km to the south-east (at its closest point)

Designated Site	Designated Feature	Distance from Site Boundary
	• Bird cherry *Prunus padus* • Juniper *Juniperus communis* Moth assemblage: • Kentish glory *Endromis versicolora* • Rannoch sprawler *Brachionycha (Asteroscopus) nubeculosa* • Angle-striped sallow *Enargia paleacea*	
NNRs		
Craigellachie NNR (SNH, 1988)	Birch woodland Open glades	9.73km south-east (at its closest point).

2.1 Aerial Photography

Review of aerial photography shows that the majority of the Site is moorland comprising of dry and wet heath, grassland and blanket bog. There are two blocks of commercial conifer plantation on the northern boundary and there are numerous patches of burned heather throughout the entire Site. The Site is roughly divided into four by streams that create altitudinal habitat zones that host a variety of floral and faunal communities.

3 Ecological Features on Site

The background information presented in this section of the OHMBEP has been sourced from the technical studies carried out to inform the proposed development EIA Report.

3.1 Habitats

3.1.1 Overview

Both a Phase 1 habitat and National Vegetation Classification (NVC) survey were undertaken across the Site. For further information on the Phase 1 and NVC communities recorded, please refer to the Clune Wind Farm EIA Report, Technical Appendix 7.1.

A summary description of the Phase 1 findings can be found below together with a summary map (Figure 7.5.2, Appendix A refers). Overall, the Site and surrounds are dominated by three habitats namely: D1 Dry dwarf shrub heath (including D.1.1 acid soils), E1.7 Wet modified bog and D5 Dry heath / acid grassland.

Table 2: Phase 1 habitats and area coverage

Description	Area (ha)	% of total area
A1.1.1 – Broad-leaved woodland - semi-natural	26.11	0.704
A1.1.2 – Broad-leaved woodland - plantation	24.97	0.674
A1.2.2 - Coniferous woodland - plantation	21.74	0.587
A1.3.2 - Mixed woodland - plantation	3.26	0.088
A2.1 - Scrub - dense/continuous	34.95	0.943
A2.2 - Scrub - scattered	47.26	1.275
A3.2 - Coniferous Parkland / scattered trees	28.21	0.761
B1.1 - Acid grassland - unimproved	71.62	1.932
B1.2 - Acid grassland - semi-improved	49.73	1.342
B4 - Improved grassland	93.64	2.526
B5 – Marsh / marshy grassland	86.34	2.329
B6 - Poor semi-improved grassland	3.05	0.082
D1 - Dry dwarf shrub heath	753.09	20.319
D1.1 - Dry dwarf shrub heath - acid	726.66	19.606
D3 – Lichen / bryophyte heath	44.74	1.207
D5 - Dry heath / acid grassland	609.48	16.444
D6 - Wet heath / acid grassland	7.08	0.191
E1.7 - Wet modified bog	2.55	0.069
E1.8 - Dry modified bog	846.46	22.838
G1.2 - Standing water	0.16	0.004
G1.3 - Standing water	0.26	0.007
G2.3 - Running water	5.94	0.160
I1.1.1 - Inland cliff – acid / neutral	2.94	0.079
I1.4.1 - Other exposure – acid / neutral	0.35	0.010
J1.3 - Cultivated/disturbed land – ephemeral / short perennial	3.84	0.104
J5 - Other habitat	38.27	1.033
J6 - Not surveyed	173.64	4.685

Description	Area (ha)	% of total area
Grand Total	3706.34	100

3.1.2 Dominant Habitats descriptions (Phase 1)

Dry modified bog (E1.8)

This habitat occupies the largest area of the Site, with wide expanses made up of deergrass *Trichophorum germanicum* to the south-west. The bogs centre around the upper reaches of the Wester Strathnoon Burn and Allt Lathach, and are dominated by heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix* and hare's-tail cotton-grass *Eriophorum vaginatum*, on peat usually deeper than 0.5m.

Very few *Sphagnum* species were found, typical of modified bogs, including red bog-moss *S. capillifolium*, flat-topped bog-moss *S. fallax* and blunt-leaved bog-moss *S. palustre* in characteristic green and red hummocks.

Apart from heather, the commonest dwarf shrub was cross-leaved heath as well as bog-myrtle *Myrica gale*. There was very little crowberry *Empetrum nigrum* and even less bilberry *Vaccinium myrtillus*. The bogs regularly recorded species such as common cotton-grass *Eriophorum angustifolium* and woolly fringe-moss *Racomitrium lanuginosum*, as well as various lichen species in the genus *Cladonia*. The abundance of these species suggests bogs that are slightly drier than those with more *Sphagnum*, hence the dry modified bog classification (JNCC, 2016).

The modified bogs were all examples of the NVC community M19, floristically grading into M20 in localised areas.

Dry dwarf shrub heath – acid (D1.1)

This habitat occupies large swathes of the Site, with wide expanses made up of more than 25% ericoids or small gorse species in relatively dry conditions, usually constrained to the steeper slopes and higher areas of the Site, for example on the hillsides toward the north-west. This habitat is dominated by heather, bell heather *Erica cinerea*, bilberry and western gorse *Ulex gallii* (JNCC, 2016), with patches of common juniper *Juniperus communis* scrub along the hillsides (JNCC, 2016).

The dwarf shrub heath is an example of NVC communities H10 and H13.

Dry heath / acid grassland (D5)

This habitat is a mosaic of dry heath and acid grassland. The hillsides on Site are heavily grazed by sheep and deer and are quite species poor, and these regions usually intersect areas of bog and dry heath as a transition zone. These areas are abundant in the species wavy hair-grass *Deschampsia flexuosa*, heath-rush *Juncus squarrosus*, and sheep's sorrel *Rumex acetosella* (JNCC, 2016), with patches of soft-rush *Juncus effusus* and *Sphagnum* flush in amongst the streams (JNCC, 2016).

This habitat type is an example of NVC communities U5 and H10.

3.1.3 Minor Habitats

Broad-leaved woodland – semi-natural (A1.1.1)

There are two patches in the north-west corner and another on the lower reaches of the Allt Phris of ancient birch woodland, with both silver birch *Betula pendula* and downy birch *Betula pubescens* protected from grazing by fencing. These areas of woodland are considered ancient/climax series as they contain mature trees which host endemic species such as chaga *Inonotus obliquus*. Other tree and shrub species recorded include aspen *Populus tremula*, grey willow *Salix cinerea*, eared willow *Salix aurita*, and gorse *Ulex europaeus* (JNCC, 2016).

Broad-leaved woodland – plantation (A1.1.2)

Within the survey area there is a small patch of broad-leaved plantation woodland on the northern boundary which contains both silver and downy birch, and Scots pine *Pinus sylvestris* (JNCC, 2016).

Coniferous woodland – plantation (A1.2.2)

Within the buffer zone on the eastern boundary there is a strip of coniferous woodland plantation on the opposite side of the A9 comprising of Scots pine and European larch *Larix decidua*. Similarly, there is a patch in the buffer zone on the northern boundary (JNCC, 2016).

Mixed woodland – plantation (A1.3.2)

Mixed woodland plantation was recorded on the northern boundary of the Site, straddling the minor road. These areas are comprised mostly of silver birch and Scots pine (JNCC, 2016).

Scrub- dense/continuous (A2.1)

Toward the north-west of the Site there are numerous patches of dense scrub which includes species such as gorse and common juniper, with occasional silver birch (JNCC, 2016).

Scrub – scattered (A2.2)

In the north-west, along the river, these areas of scattered scrub consist of common juniper and silver birch bordered by semi-improved heath and grassland used by grazing sheep and cattle. The relatively steep banks of the lower to middle reaches of the Wester Strathnoon Burn are banked by mature scattered scrub consisting of common juniper and gorse (JNCC, 2016).

Parkland/coniferous scattered trees (A3.2)

Scattered examples of Scots pine and silver birch with less than 30% cover are present on grazing land for cattle and sheep (JNCC, 2016).

Acid grassland – unimproved (B1.1)

This habitat resides in the north-west of the Site, on the southern banks of the River Findhorn. They are relatively species rich areas found on acidic soils that grade into dry

dwarf shrub heath. Dominant species include wavy hair-grass and heath bedstraw *Galium saxatile* (JNCC, 2016).

Acid grassland – semi-improved (B1.2)

These are largely areas dominated by wavy hair-grass with frequent heath bedstraw. Small patches can be found along the lower reaches of the Clune Burn, Western Strathnoon Burn and Caochan Seachdag, where cattle and sheep roam freely (JNCC, 2016).

Improved grassland (B4)

These areas of the Site are in the north-west toward the River Findhorn which are heavily grazed by sheep and cattle. The species richness is generally poor, and pastures have been heavily affected by drainage and/or the application of herbicides and/or slurry. Species found here were typical of this habitat and include white clover *Trifolium repens*, common sorrel *Rumex acetosa* and common dandelion *Taraxacum officinale* (JNCC, 2016).

Marsh/marshy grassland (B5)

These areas of the Site are relatively wet and contain large swathes of purple moor-grass *Molinia caerulea*, rushes *Juncus* sp., and sedges *Carex* sp., with only small patches of *Sphagnum* (JNCC, 2016).

Poor semi-improved grassland (B6)

These areas are characteristic of heavily grazed and managed grassland with very little biodiversity. The species present are indicative of neutral grassland with sheep's fescue *Festuca ovina*, false oat-grass *Arrhenatherum elatius* and meadow foxtail *Alopecurus pratensis* recorded (JNCC, 2016).

Lichen/bryophyte heath (D3)

This habitat is restricted to the south-west corner of the Site, at the summit and on the north face of the Carn Dubh'Ic an Deoir. This area of heathland is dominated by heather, together with a carpet of lichens and bryophytes such as *Cladonia* sp., *Lecanora* sp., fountain apple-moss *Philonotis fontana*, rusty feather-moss *Brachythecium plumosum*, yellow fringe-moss *Racomitrium aciculare*, on soils with little depth and on bare rock on places (JNCC, 2016).

Wet modified bog (E1.7)

There is a small area of wet modified bog between two tributaries in the upper reaches of the Allt Lathach. This habitat is largely composed of exposed peat of a depth greater than 0.5m, with patches of grass and sedge such as purple moor-grass and deergrass (JNCC, 2016).

Standing water (G1)

Two examples are present: one in the north-east of the Site, and one in the north to the east of the Clune Burn.

Running water (G2)

There are four main watercourses on Site; Allt Phris, Clune Burn, Wester Strathnoon Burn, and Allt Lathach.

The Allt Phris drains into the River Findhorn from the eastern side of the Site along a relatively shallow gradient from 520m to 310m AOD, a gradient similarly followed by the Clune Burn slightly further to the west. The Allt Lathach flows through the centre of the Site, draining the hills of Carn Ruighe Shamraich, Carn Phris Mhor and Carn Coire na Cluanaich which have relatively steep banks covered by scattered scrub in the middle and lower reaches. The Wester Strathnoon Burn drains the higher regions of the Site in the West, including Carn Dubh'Ic an Deoir and Carn Leachter Beag from a height of 750m to 330m AOD.

Inland cliff – acid/neutral (I1.1.1)

There is a small patch of inland cliff on Site, classified as exposed rock surface over 2m in height at an angle of more than 60° (JNCC, 2016).

Other exposure – acid/neutral (I1.4.1)

An area in the lower reaches of the Clune Burn consisting of natural exposed rock in the riverbed (JNCC, 2016).

Cultivated/disturbed land – ephemeral/short perennial (J1.3)

There is one patch of land in the buffer zone, located on the southern bank of the River Findhorn that hosts a property with mown grass and a managed garden (JNCC, 2016).

Other habitat (J6)

These areas highlight paved roads such as the A9 in the east and the minor road that runs along the south of the River Findhorn, forming a large section of the northern boundary. There is a circuit of tracks throughout the Site that is regularly used by gamekeepers to monitor livestock, grouse, and deer populations (JNCC, 2016).

3.2 NVC Survey

The findings of the NVC survey are presented in Figure 7.5.3 (Appendix A refers).

3.2.1 Summary of the Site (Overview)

The majority of the vegetation within the Site is dominated by blanket mire habitat, NVC community M19 *Calluna vulgaris – Eriophorum vaginatum*, and dry heath, NVC community H10 *Calluna vulgaris – Erica cinerea*. The Site is also characterised by H13 *Calluna vulgaris – Cladonia arbuscula* heath at higher altitudes, U5 *Nardus stricta – Galium saxatile* grassland, W4 *Betula pubescens – Molinia caerulea* woodland along the banks of the River Findhorn and W19 *Juniperus communis ssp. – Deschampsia flexuosa* woodland situated on the steep banks of some of the watercourses on Site.

3.2.2 Community Descriptions

H10 *Calluna vulgaris – Erica cinerea* heath

Analysis of the quadrat data from the steeper, drier slopes of the Site indicate that the recorded vegetation most closely correlates NVC community H10 *Calluna vulgaris – Erica cinerea* heath. Generally, this community can be found along the middle to lower reaches of the Western Strathnoon Burn, the Allt Lathach, the Clune Burn and the Allt Phris. There are also regions toward the south of the Site around the summits of the Carn Dubh'Ic an Deoir and the Carn Phris Mhòir and it is dominant along the access track. This community is also present in a mosaic with U5 *Nardus stricta – Galium saxatile* grassland.

The dwarf shrubs are recorded alongside green-ribbed sedge *Carex binervis*; tormentil *Potentilla erecta* and heath bedstraw. Occasionally recorded was a thick carpet of bryophytes such as red-stemmed feather-moss *Pleurozium schreberi*, little shaggy-moss *Rhytidiadelphus loreus*, glittering wood-moss *Hylocomium splendens* and heath plait-moss *Hypnum jutlandicum*.

These heaths are a good habitat for upland birds, including twite *Carduelis flavirostris*, merlin *Falco columbarius*, short-eared owl *Asio flammeus*, hen harrier *Circus cyaneus* and ring ouzel *Turdus torquatus*. Red grouse *Lagopus lagopus* also occur, although they are generally rather scarce in the west where these heaths are so common.

There is one sub-community relative to the Site, *Calluna vulgaris – Erica cinerea* heath *Racomitrium lanuginosum* sub-community H10b, which is typically dominated by heather and is often overwhelmingly abundant in pioneer or building regrowth after burning. Crowberry is very frequent and it can show some local prominence among or beneath the heather amongst scattered tufts of wavy hair-grass. Bilberry occurs occasionally, though hardly ever as more than scattered shoots and crowberry and cross-leaved heath are scarce and usually found in stands that are obviously transitional to the woolly fringe-moss sub-community H10b (Rodwell, 1991) (JNCC, 2006).

H12 *Calluna vulgaris – Vaccinium myrtillus* heath

This community was recorded within the proposed fenced peatland restoration area, see Figure 7.5.4. Much of the dry heath vegetation which occurs over a large part of the survey area and particularly on the well-drained slopes, aligned most closely with H12 *Calluna vulgaris – Vaccinium myrtillus* heath, though the degree of fit was 'fair' (Quadrat 8) to 'poor' (Quadrats 1, 2 and 6). The vegetation here was dominated by ling which covered from 90 to 98% of each quadrat and was typically 20 to 30cm tall. Crowberry was frequent and cowberry and bilberry *Vaccinium myrtillus* were occasional. Heath rush *Juncus squarrosus* was frequent in Quadrat 1, but did not appear in Quadrats 2, 6 and 8. Bryophytes such as red-stemmed feather-moss and glittering wood-moss *Hylocomium splendens* were generally abundant beneath the taller vegetation. Reindeer lichen also occurred.

The H12 heath community is generally dominated by *Calluna vulgaris* and includes most of the Calluneta from less oceanic sub-montane areas where burning is commonly practised, including many grouse moors. Here a predominance of building-phase *Calluna* is found, but a more open cover of degenerate *Calluna* can often also be present. *Vaccinium myrtillus* is constant though it is usually subordinate to *Calluna* and is most vigorous out of reach of grazing animals. *Vaccinium vitis-idaea* is also found, sometimes with local prominence, and *Erica cinerea* may also be present on drier slopes.

Empetrum nigrum ssp. *nigrum* is frequent, forming mats after burning, but then becomes reduced after the *Calluna* has regrown.

In many stands herbs are rare. Only *Deschampsia flexuosa* is frequent throughout. When grazing is regular there may be additional herbs including *Festuca ovina*, *Agrostis capillaris*, *A. canina*, *Nardus stricta*, *Potentilla erecta* and *Galium saxatile*.

The ground-layer is often prominent with bulky mosses characteristic, such as *Dicranum scoparium*, *Pleurozium schreberi*, *Hypnum cupressiforme* s.l. and *Hylocomium splendens*, together with larger *Cladonia* species. Encrusting lichens and *Polytrichum* species can be abundant in the years following burning.

Burning and grazing are the major influences on floristics and structure, although climatic and edaphic difference play some part in determining variation within the community. Successional developments are usually held in check by burning and grazing and without these most stands would probably progress to scrub and woodland. Continuous heavy grazing favours the loss of sub-shrub vegetation to grassland and in some instances, particularly after burning, may result in the spread of *Pteridium aquilinum*.

H13 *Calluna vulgaris – Cladonia arbuscula* heath

Analysis of the quadrat data from some areas of higher altitude (typically above 560m AOD) displays vegetation characteristics closely associated with the NVC community H13 *Calluna vulgaris – Cladonia arbuscula* heath. This habitat is particularly dominant in the south-east of the Site, around the summit of the Carn Dubh'Ic an Deoir which aligns with the Phase 1 habitat classification D3 (bryophyte and lichen heath), as well as small patches slightly to the north and to the east at the Carn Phris Mhòir.

Species recorded include for montane plants, such as crowberry, bog bilberry *Vaccinium uliginosum* and the clubmosses *Diphasiastrum alpinum*. Also recorded was mat-grass *Nardus stricta* and velvet bent *Agrostis canina*.

Cladonia arbuscula and Cladoina portentosa are frequent to abundant. Among these, bryophytes were few and rarely of any abundance. Woolly fringe-moss is constant and formed locally frequent patches.

The H13 on Site has generally been damaged to an extent by grazing, mainly by deer.

H16 *Calluna vulgaris – Arctostaphylos uva-ursi* heath

This community was recorded within the proposed fenced peatland restoration area, see Figure 7.5.4. The dry heath vegetation on the exposed hilltop towards the north-eastern end of the survey area aligned most closely with H16 *Calluna vulgaris – Arctostaphylos uva-ursi* heath with a 'good' degree of fit. The vegetation was dominated by ling, with abundant bearberry *Arctostaphylos uva-ursi.* Bell heather *Erica cinerea*, bilberry, crowberry and heath woodrush *Luzula multiflora* were also present but at low levels of cover. Heath plait-moss *Hypnum jutlandicum* was abundant beneath the taller vegetation.

Although *Arctostaphylos uva-ursi* is found as an occasional in a variety of heath types, it is most often found in this community, which has a distinct boreal character. *Calluna vulgaris* is always present and is the most usual dominant, forming a canopy 20-40 cm high and having a substantial total cover. *Arctostaphylos uva-ursi* is constant and can become modestly abundant in gaps within the heather cover. *Erica cinerea* is also very

common but of low cover. In many stands there is some *Vaccinium myrtillus* and *V. vitis-idaea*.

Quite commonly there are small amounts of *Genista anglica*, but herbaceous associates are few except in the *Pyrola media – Lathyrus montanus* sub-community. The only constant grass is *Deschampsia flexuosa* and this can be joined by *Luzula multiflora* and *L. pilosa*.

Bryophytes are variable, with the bulkier mosses often strongly associated with particular stages in the heather regeneration cycle. *Hypnum jutlandicum*, *Pleurozium schreberi* and *Dicranum scoparium*, however, are very common overall and *Hylocomium splendens* is also a constant through much of the community.

Lichens also differ in their representation, with only *Cladonia impexa* constant and, in many stands, of low cover. Fruticose species such as *C. arbuscula* and *C. rangiferina* tend to follow the larger pleurocarps in developing among the more shady and humid conditions of older heather canopies. *Hypogymnia physodes* and, less commonly, *Cetraria glauca* can be seen on decaying woody stems.

The community forms an important part of grouse-moor in the central Highlands and although edaphic differences play some part in determining floristic variation in the community, their effects are often overlain and modified by the influence of burning which ultimately maintains this vegetation as a plagioclimax. Stretches of moorland including stands of the community are often open to livestock but there is little information on the impact of grazing on this vegetation.

M6 *Carex echinata – Sphagnum fallax/denticulatum* mire

This community was recorded within the proposed fenced peatland restoration area, see Figure 7.5.4. The vegetation surrounding a stream in a small valley towards the south-eastern corner of the site aligned most closely with M6c *Carex echinata – Sphagnum fallax/denticulatum* mire, *Juncus effusus* subcommunity with a 'good' degree of fit. The community here was dominated by soft-rush *Juncus effusus*. Blunt-leaved bog-moss *Sphagnum palustre*, fringed bog-moss *Sphagnum fimbriatum* and common haircap *Polytrichum commune* were frequent here. Also present, but at lower levels of cover, were common sorrel *Rumex acetosa*, marsh violet *Viola palustre*, star sedge *Carex echinata* and grasses such as bent *Agrostis* sp. Another area of M6c was noted near to the access road at the southern end of the site. The vegetation here was also dominated by soft-rush.

This community has a distinct general character but includes a wide variation in composition, expressed here in four sub-communities. Essentially it is a poor-fen with small sedges or rushes dominating over a carpet of oligotrophic and base-intolerant *Sphagnum* spp. The constants are very few. Among vascular plants only *Carex echinata* has a uniformly high frequency, but *C. nigra* and *C. panicea* are common, and *C. demissa* occasional. There are two negative characters which aid definition of this community. Firstly, the general absence of more calcicolous *Carex* species, e.g. *C. dioica*, *C. pulicaris*, *C. lepidocarpa* and *C. flacca*, helps to separate this community from the Caricion davallianae rich fens (M9 to M12), and secondly, only local occurrence of species like *C. rostrata* and *C. curta* marks the vegetation off from communities like the *Carex rostrata – Sphagnum recurvum* mire (M4).

The most common vascular associates are grasses and poor-fen dicotyledons. Among the grasses, *Agrostis canina* ssp. *canina* and *Molinia caerulea* are the most common but

Anthoxanthum odoratum is also frequent. Commonly occurring poor-fen dicotyledons include *Viola palustris* and *Potentilla erecta*, and occasionally one or more of

A ground carpet of *Sphagnum* spp. is prominent and it is most frequently composed of *S. recurvum* and *S. auriculatum*, with occasional occurrence of *S. subnitens* and *S. papillosum*. There are only a few other commonly occurring bryophyte species. *Polytrichum commune* is very frequent, *Rhytidiadelphus squarrosus* is occasional and *Calliergon stramineum* and *Aulacomnium palustre* are patchy throughout. *Calliergon cuspidatum* and *Plagiothecium undulatum* are conspicuously rare.

In the M6c *Juncus effusus* sub-community, sedges are less frequent and abundant and the vegetation is dominated by *Juncus effusus*. Frequent vascular associates are few but there is often some *Agrostis canina* ssp. *canina*, *Potentilla erecta*, and (rather diagnostic here) *Galium saxatile*. *Carex echinata*, *Molinia caerulea* and *Viola palustris* are also fairly common. The *Sphagnum* carpet is generally extensive and luxuriant and *S. recurvum* is almost always dominant. *Polytrichum commune* remains frequent and sometimes abundant.

This sub-community is found throughout the range of M6.

M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire

The vegetation sampled across much of the Site, particularly in the development area, most closely aligns with NVC community M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire. The habitat is prevalent in the upper reaches of the Allt Lathach and Western Strathnoon Burn and generally in areas of higher altitude and shallower gradient where water retention is slightly higher. It is recognised that there has been historic burning, drainage, grazing and on-going management of the area resulting in localised patches of this community floristically grading towards M20 *Eriophorum vaginatum* raised and blanket mire.

On Site these mire habitats comprise frequent to abundant heather and hare's-tail cotton-grass, along with common cotton-grass, bilberry, and crowberry. *Sphagnum* was occasionally prominent over wetter areas, mainly *Sphagnum capillifolium*, woolly fringe moss, and large mosses such as glittering wood-moss, red-stemmed feather-moss, flat topped bog-moss, and little shaggy-moss. The blanket bog was, in general, very species poor with regards to peat forming species of *Sphagnum*. In many places the vegetation is broken by hags, with great spreads of bare peat.

Deergrass was locally frequent along with purple moor-grass and herbs such as tormentil, heath milkwort *Polygala serpyllifolia*, and lousewort *Pedicularis sylvatica* were recorded occasionally to frequently. Wavy hair-grass and heath-rush were locally abundant and, at higher altitudes, common sedge *Carex nigra* was recorded locally frequently.

Three sub-communities are described in the NVC, but they do not represent the most obvious patterns of floristic and ecological variation among the M19 community displayed on Site. In broad terms, the sub-communities form a series from oceanic, southern, or western vegetation to northern, boreal and montane vegetation. The *Vaccinium vitis-idaea - Hylocomium splendens* sub-community M19c is most relevant to the Site; it takes in an assortment of more northern or montane mires, generally with cowberry, bilberry, crowberry and *Cladonia portentosa*. Papillose bog-moss *Sphagnum papillosum* can be common here, and there can also be a few upland mire species such as common sedge, bilberry, ribbed bog-moss *Aulacomnium palustre* and cloudberry *Rubus chamaemorus*

U5 *Nardus stricta – Galium saxatile* grassland

Analysis of quadrat data from riverbanks and adjacent to tracks indicated that the vegetation most closely relates to the NVC community U5 *Nardus stricta – Galium saxatile* grassland. This habitat is dominant in the middle reaches of the aforementioned streams as well as the Caochan Seachdag and the Caochan a' Phuill in the west of the Site. The *Nardus* grassland is commonly present in a mosaic with H10 *Calluna vulgaris – Eriophorum vaginatum* blanket mire, grading between the two regularly.

Along with frequent to abundant mat grass, sweet vernal-grass *Anthoxanthum odoratum* and viviparous fescue *Festuca vivipara* were also frequently recorded on Site. Herbs include for tormentil and heath bedstraw. Sedges such as star sedge *Carex echinata* were occasional within the habitat and rushes such as heath-rush, soft-rush, compact rush *Juncus conglomeratus* and jointed rush *Juncus articulates* were scattered throughout the habitat. Bryophytes recorded include for heath plait-moss, red-stemmed feather-moss, springy turf-moss R*hytidiadelphus squarrosus*, and glittering wood-moss.

There are two sub-communities present on Site, however, neither strongly represent the floristic characteristics of the U5 habitats. The species-poor sub-community U5a takes in the most impoverished *Nardus* grasslands and has no distinguishing species of its own. The *Carex panicea - Viola riviniana* subcommunity U5c extends the range of the community onto flushed, mildly base-rich soils where there can be an array of mesotrophic species such as meadow buttercup *Ranunculus acris*, smooth lady's-mantle *Alchemilla glabra*, alpine meadow-rue *Thalictrum alpinum*, water avens *Geum rivale*, meadowsweet *Filipendula ulmaria*, globeflower *Trollius europaeus* and alpine bistort *Persicaria vivipara* (JNCC, 2004) (Rodwell, 1991) (JNCC, 2006).

W4 *Betula pubescens – Molinia caerulea* woodland

Two small patches of semi-natural broad-leaved woodland on the north-western boundary of the Site present vegetation characteristics that most closely align with NVC community W4 *Betula pubescens – Molinia caerulea* woodland. These are both found in the patches of ancient woodland on the southern edge of the River Findhorn, surrounded by fencing to prevent the degradation of the habitat by grazing of livestock and wild herbivores.

The W4 woodland on Site comprises mainly downy birch and silver birch, grey willow, eared willow, and gorse. The field layer comprises bryophytes such as big shaggy-moss *Rhytidiadelphus triquetrus*, neat feather-moss *Pseudoscleropodium purum*, little shaggy-moss, common Tamarisk-moss *Thuidium tamariscinum* and common haircap *Polytrichum commune*.

W19 *Juniperus communis* ssp. *communis – Oxalis acetosella* woodland

Analysis of the quadrat data from the lowland scrub habitat along stream banks, most notably on the Wester Strathnoon Burn, indicates that the vegetation most closely aligns to W19 *Juniperus communis ssp. communis – Oxalis acetosella* woodland.

There are two sub-communities: one with a heathy ground flora and one with a grassy, herb-rich ground flora. The most relevant *Viola riviniana – Anemone nemorosa* sub-community W19b includes bilberry, cowberry, Yorkshire-fog *Holcus lanatus*, and germander speedwell *Veronica chamaedrys*, as well as common dog-violet *Viola riviniana* and wood anemone *Anemone nemorosa*. There can be lush patches of ferns, which most commonly include oak fern *Gymnocarpium dryopteris*. Under these plants is

a loose weft of mosses including big and little shaggy-mosses (JNCC, 2004) (Rodwell, 1991) (JNCC, 2006) (UKNC, 1992).

3.3 Fauna

Below is a summary of the findings from the onsite surveys, for the detailed survey results refer to Technical Appendices 7.2 – 7.4, 7.8 and 8.1.

3.3.1 Bats

The site of Clune Wind Farm is characterised by an area of upland, exposed habitat which offers sub-optimal habitat for bats in terms of foraging and commuting. With respect to roosting, the Site offers no significant potential due to a lack of structures and mature deciduous woodland habitat.

Activity levels across the Site were low with most of the bat activity relating to common pipistrelle and soprano pipistrelle and to a lesser extent Myotis Species.

3.3.2 Otter

A desktop study and field survey resulted in no evidence of otter. The main watercourses within the survey area and the banks of the River Findhorn were surveyed and no evidence recorded.

Results from the Fish Habitat Survey identified old otter spraint at three locations on the Allt Lathach.

3.3.3 Wildcat

The Site does not offer optimal habitat for wildcat *Felis silvestris* being mainly open moorland, maintained as a grouse moor. No evidence of this species was found during the field survey. The species is in significant decline, and this is not recognised as a priority area for wildcat.

3.3.4 Pine Marten

No signs of pine marten *Martes martes* were recorded during the survey. Woodland along the northern edge of the Site along the River Findhorn is considered to be suitable habitat but evidence was recorded in the survey area, including a 250m buffer.

3.3.5 Water Vole

Evidence of water vole *Arvicola amphibius* was recorded along the middle to upper reaches of the Allt Lathach and Clune Burn. A burrow entrance with fresh faeces were recorded on the Clune Burn. Further upstream, a burrow was found with mud piles breaking through the surface. Along the Allt Lathach, burrows were recorded close to the track. More burrows were observed along the Caochan Leiteir (tributary of the Allt Lathach).

3.3.6 Badger

Results of the badger survey are included in Technical Appendix 7.8: Confidential Protected Species Survey Report.

Evidence of badger *Meles meles* was found within the survey area at two locations.

3.3.7 Red Squirrel

A desktop study and field survey resulted in no evidence of red squirrel *Sciurus vulgaris*. The woodland along the northern Site boundary is suitable habitat for red squirrels, as was the neighbouring plantation until it was recently felled. However, no evidence of red squirrel was recorded within the Site or the 250m buffer.

3.3.8 Fish

The suitability of the habitats encountered onsite was varied across the Site with Alt Lathach providing good quality habitat for breeding fish and this was confirmed by the abundance of parr and otter spraints recorded in the vicinity indicating the watercourse is providing suitable conditions to sustain healthy fish populations. In other areas of the Site the picture is mixed with the habitat suitability variable between good and poor. Poor suitability related impassable culverts and other obstacles together with silt that blocks watercourses and or degrades water quality.

3.3.9 Birds

A total of 19 target species were recorded during the vantage point watches – bean goose *Anser fabalis*, curlew *Numenius arquata*, golden eagle *Aquila chrysaetos*, golden plover *Pluvialis apricaria*, goshawk *Accipiter gentilis*, greylag goose *Anser anser*, hen harrier *Circus cyaneus*, herring gull *Larus argentatus*, lapwing *Vanellus vanellus*, merlin *Falco columbarius*, mute swan *Cygnus olor*, osprey *Pandion haliaetus*, oystercatcher *Haematopus ostralegus*, peregrine *Falco peregrinus*, pink-footed goose *Anser brachyrhynchus*, red kite *Milvus milvus*, short-eared owl *Asio flammeus*, snipe *Gallinago gallinago*, and white-tailed eagle *Haliaeetus albicilla*.

4 Outline Habitat Management Plan

4.1 Outline HMBEP Areas

It is proposed that the outline HMBEP area will predominantly be the same as the planning application boundary (the "Site"). Within this, certain areas will be identified for specific management measures depending on their particular characteristics. One of the HMP areas (Area C) will be located outwith the Site boundary, in the adjacent estate landholding. Approximate areas of habitat restoration and management are proposed as follows:

- Area A: Peatland restoration (fenced) – 80 ha
- Area B: Peatland restoration (unfenced) - 322 ha
- Area C: Area for woodland regeneration – 704 ha
- Total - **1105 ha**

There are areas within the Site that currently support vegetation that most closely align with a dry, modified blanket bog classification. The dominant NVC community here is M19 *Calluna vulgaris – Eriophorum vaginatum* which has been negatively impacted upon by modern estate practices.

4.2 Outline HMBEP Heads of Terms

The outline prescriptions have been allocated a unique identifier in the following text, consisting of the text Clune followed by the prescription number. Outline prescriptions are summarised in Table 3.

4.3 Peatland Restoration (Onsite)

4.3.1 Aims

To stabilise and restore morphology of onsite peat soils.

To enable natural regeneration of vegetation in the post development phase, with particular focus on the dominant NVC communities M19 *Calluna vulgaris – Eriophorum vaginatum,* dry heath and H10 *Calluna vulgaris – Erica cinerea*.

Meeting these aims will promote biodiversity and the ecosystem services that healthy peatland habitats provide, including carbon sequestration.

4.3.2 Background and Intervention Measures

The focus of Peatland restoration relates to both the post construction impacts and the existing onsite degraded peatland habitats. The construction phase is likely to impact on the peatland habitats within the development envelope of the Site. During construction phase, the focus on the conservation of sub-soils and turf should be made a priority, facilitating the effective remediation of the Site during the post construction phase.

Areas of the Site (outside of the proposed development footprint) have become degraded over time, creating non-natural morphology such as hags and deformed gullies exposing peat and a loss of vegetation. Removing the cause of these features and post construction ground works are required in order to restore the peatland

habitats. This work will include the improvement of waterway profiles throughout the peatland habitat.

Clune1: Peatland restoration – ground works

Peatland restoration should be incorporated into the remediation of the land post construction. This will include any gaps between vegetation cover and proposed development infrastructure, such as sides of roadways, but also include any areas where temporary storage and or other activities have disturbed/damaged the turf. Mitigation should incorporate recycled topsoil and turf excavated from the construction phase into the remediation works.

The methods for rewetting peatland should follow the guidance provided by Peatland Action. Which methods are suitable will depend on the nature of degradation and opportunities for re-wetting and the restoration site, see Figure 7.5.4 for the locations. The approach should be discussed with key stakeholders including NatureScot and the chosen contractor. The agreed approach would be set out in detail in the finalised HMBEP post-consent.

Figure 7.5.4 shows the extent of the Site together with the proposed enhancements. There are two key areas of peatland enhancement: Area A: Peatland restoration fenced (mapped in brown) and, to the west, Area B: Peatland restoration unfenced (mapped in orange).

As the titles suggest, Area A will benefit from fencing once the restoration has been finalised. This area is naturally low-lying but the degraded peatland in the south-west of the area will be raised and landscaped from excavated spoil from the construction phase together with conserved top turf. The fencing will comprise of standard livestock fencing to prevent grazing by sheep. A deer management plan (DMP) will be implemented to control deer numbers and reduce browsing to a more sustainable level (see **Clune5** in section 4.7 below).

As can be seen from Figure 7.5.4, Area B is far more extensive than Area A (approximately 322 ha and 80 ha, respectively), and it has numerous features of highly degraded peatland including hags and deformed gullies. These features will be reprofiled throughout the restoration site, enabling native plant life to recolonise. Where possible, conserved topsoil and turf will be incorporated in the earthworks to expedite the restoration process.

4.4 Peatland Enhancement - Plug Planting (Onsite)

4.4.1 Aim

To create greater diversity of upland moorland habitats on Site, potentially attract a greater number of pollinator species, and provide support for a greater biomass of individuals.

4.4.2 Background and Intervention Measures

Due to intensive land management, large areas of upland moorland across Scotland and the rest of the UK have become degraded in terms of the level of biodiversity that they support. This Site is no different. Therefore, by restoring the diversity in the moorland plant communities, the wider benefits of improved ecosystem services will be realised.

Clune2: Peatland enhancement – Plug planting

Guided by aerial photos and walk over surveys, native upland species of forbs will be planted in suitable locations and densities across Area B on Figure 7.5.4. See Appendix B for a list of potential species to be planted that will be of local provenance, or where this is not possible, Scotland/UK provenance.

The likely suitable receptor areas will be M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire communities. Where any specimens fail, these will be restocked in year 2.

4.5 Native Woodland Regeneration (Offsite)

4.5.1 Aim

To restore upland native woodland that was once widespread across the Highlands.

4.5.2 Background and Justification

Native Caledonian pine woodlands have been greatly reduced across the Scottish Highlands, compared with their historic extent, as shown in the Caledonian Pinewood Inventory data (available at https://open-data-scottishforestry.hub.arcgis.com). They are key refuges for iconic and threatened wildlife such as capercaillie and a suite of other associated wildlife unique to this habitat. Expansion through facilitating natural regeneration will contribute to the long-term work of restoring and reconnecting fragments of native woodland across north Scotland. Due to the sensitivity of the habitat and the potential risk of introducing pathogens or inappropriate tree planting, only tightly controlled natural regeneration will be allowed to progress within 1 km of the existing Caledonian Forest. Advanced management techniques will be adopted, if considered appropriate by the habitat management team, such as robo-cutting of ground vegetation, to facilitate an appropriate seed bed for natural regeneration where this is likely.

Clune3: Native woodland creation – natural regeneration

Aerial photos and walk over surveys will be used to guide the promotion of natural regeneration of native woodland within the Caledonian Pinewood. Natural process will be allowed to take the lead, with monitoring to ensure no non-native species are establishing within or close to the Caledonian Pinewood and to monitor the health of the woodland.

No tree planting will be undertaken. Instead, natural regeneration will be encouraged in Area C, as shown on Figure 7.5.4. No tree regeneration will be allowed within 1km of the proposed turbine locations. It is considered that the risks of disease introduction associated with tree planting are too great, considering the proximity of the Caledonian Pinewood and the risk of spreading pathogens which are impacting native pinewoods across Scotland e.g. *Curreya pithyophila* and *Crumenulopsis sororia*.

It is considered that there is ample native seed source to allow for natural regeneration in Area C shown on Figure 7.5.4. The area of proposed natural regeneration sits adjacent to a non-native conifer plantation and so management will include removal of non-native conifer saplings when they appear. There are pockets of birch and rowan as well

as Scots pine within and surrounding the proposed habitat management area C, these native species will be encouraged to regenerate naturally throughout.

Successful natural regeneration will require careful control of herbivore populations; deer and sheep in particular. A deer population assessment will be required to establish baseline numbers and a plan maintenance of healthy population. As such, a DMP is recommended to inform this Outline Habitat Management plan (see **Clune5** in section 4.7 below). Control of herbivore numbers will be critical for the success of natural regeneration, particularly since no deer fencing will be constructed, due to threat to capercaillie from collisions.

Regarding sheep grazing, in the absence of more fencing to protect the woodland, virtual fencing could be used instead to prevent sheep accessing this area and allow the woodland to regenerate.

4.6 Control of Herbivores (Mountain Hare)

4.6.1 Aims

To maintain sustainable population of mountain hare *Lepus timidus* and to achieve an appropriate balance between mountain hare and their habitat condition.

To minimise unacceptable damage on the restoration/creation of on-site habitats.

4.6.2 Background and Justification

The aims and objectives of the current on-site management approach is to restore and create native Caledonian woodland. Currently, mountain hare is a significant presence with the potential to threaten the establishment of native Caledonian woodland. Current monitoring indicates that the population is at an acceptable level.

It is important to recognise the importance of the mountain hare as a priority conservation species (near threatened status) and listed in Annex V of EC Habitats Directive 1992 which limits methods of capture. The population size in Scotland is poorly understood due to the difficulty in surveying (species mainly nocturnal), together with dramatic fluctuations (every 4-15 years), due to multiple factors such as disease and habitat condition. In Scotland, mountain hare habitat preference is associated with open moorland/peatland habitats, although they will utilise all open easily accessible upland habitats. Where herbivore populations are controlled at low densities, natural regeneration will take place in the dry heath habitats, leading to the establishment of native woodland, and in time (ten plus years), will be less vulnerable to the impacts of herbivores.

NatureScot oversee the framework and licencing system to permit the control of mountain hare in certain circumstances, including when establishing woodlands.

Clune4: Herbivore Control (Mountain Hare)

Identify a strategy to manage mountain hare on Site through the development of a control plan. Identify all feasible control options available and implement accordingly and approach NatureScot for a control licence as directed by the control plan. The control plan itself should be directed by ongoing monitoring (see monitoring prescription **Clune10**).

4.7 Control of Herbivores (Deer)

4.7.1 Aims

To maintain sustainable population of deer.

To achieve an appropriate balance between the deer population and the condition of the onsite and offsite habitats considered in the OHMBEP.

4.7.2 Background and Justification

There are four species of deer in Scotland, with red and roe deer being the dominant species in the Highlands. Deer populations in parts of the Highlands are well understood to be at levels that are unsustainable, causing significant impacts to forestry, agriculture and semi-natural habitats. Populations have greatly increased, thanks to a lack of natural predators and populations sustained for recreational purposes. The Deer Act 1996 together with other legal frameworks and climate change policies seek to promote effective deer management to control deer populations at sustainable levels. Achieving the long-term aim of sustainable deer management can benefit the economy, environment and local communities. A key outcome from the successful implementation of the OHMBEP and the subsequent full HMBEP will be to reduce grazing pressure enabling natural regeneration of native woodland that will contribute to wide ranging environmental targets from climate change through to the capercaillie emergency plan.

Clune5: Herbivore Control (Deer)

Ensure a DMP for the Site is in place, together with a deer working plan to oversee the strategy and implementation of deer management across the Site and the wider landscape. To control and manage the deer population, it is necessary to collate historical data on deer counts and cull data which should be fed into population models to generate future cull targets. Monitoring deer and their impacts is crucial in assessing the effectiveness of the DMP.

4.8 Control of Predators

4.8.1 Aims

To reduce the population size of on-Site predators to an appropriate level.

To minimise the impact of predators on the breeding success of off-site waders and on-site upland breeding birds.

4.8.2 Background and Justification

The breeding success of upland moorland birds (e.g. black grouse, curlew, lapwing and skylark) and waders (on-site and nearby off-site populations) can be significantly impacted upon by predators. Studies have shown that targeted control measures can significantly benefit the breeding success of upland waders and moorland birds (Fletcher, K., Aebischer, N. J., Baines, D., Foster, R. and Hoodless, A. N., 2010). It is considered that on-site predators have historically impacted upon upland moorland and wader birds.

Clune6: Predator control

Adopt a predator control plan setting out key control activities relating to each predator across the Site throughout the year. Review the plan annually (see monitoring prescription **Clune12**.)

4.9 Monitoring

4.9.1 Aim

To ensure the enhancement intervention measures (Sections 4.3 through to 4.8) are successfully meeting their desired outcomes.

4.9.2 Outline Prescriptions

Clune7: Plug plant monitoring

Clune8: Natural regeneration monitoring

In order to assess the effectiveness of the proposed enhancement techniques long-term vegetation / habitat monitoring will be undertaken from year 1 onwards, with the aim being to monitor the long-term condition of the Site through a programme of fixed-point photography and quadrat monitoring in years 1, 3 and 5. These surveys will be undertaken for the life of the project. Where the results do not meet expectations, current management should be reviewed and altered accordingly.

Clune9: Mountain hare monitoring

Clune10: Deer monitoring

Monitoring mountain hare populations are to be directed by the control plan. Fixed transects monitoring field signs across the Site to ascertain relative activity will be run on an annual basis whilst the control measures are being undertaken. Analysis should focus on correlations between activity and impact on the Site, with particular focus on the enhancement areas as set out in Figure 7.5.4.

Monitoring of deer will be directed by the DMP. Direct counts, cull numbers and impact scores on the Site will be recorded annually.

Where the results of either of these monitoring programmes fail to provide figures to fit within broadly expected trends, methodology and implementation should be evaluated and adjusted accordingly.

Clune11: Post-construction breeding bird surveys to monitor effect of the wind farm and predator control plan.

Clune12: Post-construction vantage point (VP) surveys to monitor effect of the wind farm.

Clune13: Post-construction raptor surveys to monitor effect of the wind farm.

Although the effect of wind farms on flora and fauna is relatively well understood, it is important that models and understanding of the effect is continuously refined in order to inform future developments.

Ornithological post-construction monitoring should be undertaken in years 1, 3 and 5 following the commencement of operation, with a review being undertaken as to the need for any further monitoring following year 5 (**Clune12 &13**). At these times it will be appropriate to monitor the state of the constructed and remediated habitats. With respect to **Clune11**, monitoring will be carried out on an annual basis to capture the fluctuations in breeding upland moorland birds' populations, to further the understanding of the impacts of the wind turbines, but also to evaluate the ongoing annual predator control measures.

The aim would be to monitor bird populations within the proposed development to ensure that the wind farm and OHMBEP management prescriptions are not having unpredicted adverse effects on the bird populations present, and to ensure that the OHMBEP is effective in supporting the bird populations on Site.

Although the detailed scope of the monitoring will be agreed with THC, NatureScot and RSPB Scotland, the following surveys will be carried out:

- Breeding bird surveys using a Brown and Shepherd approach (Brown and Shepherd, 1993) to allow breeding waders to be monitored across the Site (**Clune11**).
- Vantage Point (VP) surveys to monitor the effect of the wind farm on protected species (**Clune12**).
- Breeding raptor surveys are required to assess impacts to breeding success and or changes to on Site raptor behaviour (**Clune13**).

The outline monitoring scheme should be reviewed on a 5-yearly basis. On-going monitoring commitments will be reviewed and, if necessary, any adjustments to the OHMBEP will be carried out.

4.9.3 Summary of Outline Prescriptions

Table 3: Outline Prescriptions and Proposed Monitoring Schedules

ID	Target Feature	Prescription Type	Timing	Programme	Responsibility
Clune1	Peatland Restoration areas	Natural Regeneration of Vegetation	Summer	During construction	Applicant / Suitably Qualified Ecologist
Clune2	Peatland Restoration areas	Peatland enhancement - Plug planting (onsite)	Summer	During construction with subsequent regular monitoring	Applicant / Suitably Qualified Ecologist
Clune3	Native woodland creation areas	Woodland Regeneration	April - July	Years 1, 2 and 5	Applicant / Suitably Qualified Ecologist
Clune4	Across Site	Herbivore Control	As directed by Control plan	Years 1-3	Land Owner

ID	Target Feature	Prescription Type	Timing	Programme	Responsibility
		(Mountain Hare)			
Clune5	Across Site	Herbivore Control (Deer)	As directed by DMP	Ongoing	Land Owner
Clune6	Across Site	Predator Control	All year	Ongoing	Land Owner
Clune7	Peatland restoration areas	Plug plant Monitoring	April-August	Years 1 and 2	Applicant / Suitably Qualified Ecologist
Clune8	Native woodland creation areas	Natural Regeneration Monitoring	May-August	ongoing	Applicant / Suitably Qualified Ecologist
Clune9	Across Site	Hare Monitoring	As directed by Control plan	Years 1-3	Applicant / Suitably Qualified Ecologist
Clune10	Across Site	Deer Monitoring	As directed by DMP	ongoing	Land Owner
Clune11	Across Site and 500m buffer	Breeding birds (Brown and Shepherd)	April – July	Annual	Applicant / Suitably Qualified Ecologist
Clune12	Across Site and 500m buffer	Vantage Point (VP) surveys	March - August	Years 1, 3 and 5 (frequency of subsequent monitoring dependent on initial monitoring results)	Applicant / Suitably Qualified Ecologist
Clune13	Across Site and 500m buffer	Breeding Raptor Monitoring	April-August	Years 1, 3 and 5 (frequency of subsequent monitoring dependent on initial monitoring results)	Applicant / Suitably Qualified Ecologist

4.10 Management and Implementation

In accordance with good land management practice, a register of management works undertaken on Site will be maintained to ensure that works are consistent with the agreed objectives of the OHMBEP.

Implementation of the OHMBEP should ensure the notable protected species highlighted in Section 3.3 are not impacted upon by the management prescriptions and monitoring programmes as set out in the above OHMBEP.

4.11 Additional Benefits

4.11.1 Ecology

As stated in Section 9: Hydrology, Hydrogeology and Peat of the EIA Report for Clune Wind Farm, two new water crossings will be constructed (WX03 and WX10, Figure 9.1 refers). These will facilitate the improvement of water quality and flow, and enable the potential upstream migration of fish to areas of previously identified good quality fish habitat and improve foraging opportunities for otter.

The enhancements set out in this plan will have wide ranging benefits to the habitats and species recorded both on and off site, as well as broader ecosystem services such as improving water quality. The proposed peatland restoration measures aimed at regenerating vegetation in degraded and disturbed areas, together with the proposed deer control measures will benefit breeding moorland birds such as red grouse, waders (lapwing, golden plover, curlew, snipe), skylark and meadow pipit through improvements in habitat quality. Reducing the numbers of legally controllable predators such as foxes, stoats, weasels and crows will also benefit these and other wader species in terms of increased breeding productivity both onsite and in the breeding grounds immediately to the north of the proposed wind farm, along the River Findhorn.

The regeneration of native Scots pine woodland has the potential to benefit regionally important bird species such as capercaillie, crested tit and Scottish crossbill. This is particularly significant given the nearby tracts of native Caledonian forest potentially providing connectivity with other populations. However, no tree regeneration will be allowed within 1 km of the turbine locations, to help prevent collision of various protected species with the turbines, including capercaillie and bats. The establishment of native broadleaved woodland (birch / rowan / hazel / aspen on the drier slopes and willow / alder woodland in wetter parts of the Site) will provide suitable habitat for a diverse assemblage of breeding birds, as well as providing additional feeding and roosting opportunities for birds during winter.

4.11.2 Socio-economic Benefits

Many aspects of the OHMBEP will deliver far reaching benefits to the Site and the environment. It is highly likely that there will also be multiple benefits to the local communities who live in proximity to the Site. A key benefit will be the creation of new jobs for local people working in forestry (tree management), control of herbivores and predators together with the processing of by-products such as venison.

4.12 Development and Implementation of Final HMBEP

It is proposed that once the Site is granted planning permission, a suitably worded condition will be attached, requiring the development of a full HMBEP.

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Appendices

Appendix A. Figures

Figure 7.5.1 - Site Location

Figure 7.5.2 - Phase 1 Habitat Survey Results

Figure 7.5.3 - NVC Survey Results

Figure 7.5.4 - Habitat Enhancement

Appendix B. Plug Planting List

Table 4: Planting list

Common Name	Latin name	Guidance / target location
Bell Heather	Erica cinerea	Most of the site avoiding wet areas
Blaeberry	Vaccinium myrtillus	Ideal species to plant in areas of soil erosion
Bog Asphodel	Narthecium ossifragum	Wet areas with high levels of peat in the soil
Bog myrtle	Myrica gale	Wet areas
Common Cottongrass	Eriophorum angustifolium	Wet areas
Common Heather	Calluna vulgaris	All areas
Cowberry	Vaccinium vitis-idea	All areas
Cross-Leaved Heath	Erica tetralix	Wet areas
Crowberry	Empetrum nigrum	Wet areas where peat soils are prevalent (ideal species to remediate areas of erosion)
Hare's-tail Cottongrass	Eriophorum vaginatum	Wet areas
Heath bedstraw	Galium saxatile	All areas
Heath Rush	Juncus squarrosus	All areas
Heath violet	Viola riviniana	All areas
Jointed Rush	Juncus articulatus	Wet areas
Marsh Violet	Viola palustris	All areas
Sharp-Flowered Rush	Juncus acutiflorus	All areas
Sheep's Sorrel	Rumex acetosella	All areas
Sphagnum moss	Sphagnum compactum	Wet areas with high levels of peat in the soil
Sphagnum moss	Sphagnum strictum	Wet areas with high levels of peat in the soil
Tormentil	Potentilla erecta	All areas